

Claims

1. A device (200, 300) for patterning structures (207, 307) on a substrate (201, 301) comprising:
 - 5 an imaging device (202, 302) having a scanning tip (203, 303);
 - a light emitting device (204, 304), and
 - a space around the scanning tip, which space comprises a vapour of a material which is suitable for Chemical Vapour
 - 10 Deposition onto the substrate (201, 301) when decomposed,
 - wherein the light emitting device (204, 304) is adapted to emit a light beam (206, 306), which light beam has an intensity that is not capable to decompose the vapour, onto the tip (203, 303) in such a way that an electromagnetic field induced by the
 - 15 light beam (206, 306) near the tip (203, 303) is high enough to decompose the vapour.
2. The device according claim 1, wherein the light emitting device (204, 304) is a laser.
- 20 3. The device according claim 1 or 2, wherein the imaging device (202, 302) is one of an Atomic Force Microscope and a Scanning Tunneling Microscope.
- 25 4. The device according claim 2 or 3, wherein the laser device (204, 304) is adapted to emit the light beam (206, 306) onto the tip (203, 303) in such a way that the polarization is parallel to a longitudinal axis of the tip (203, 303).
- 30 5. The device according to anyone of the claims 1 to 4, wherein the tip (203, 303) has a dimension between 5 nm and 20 nm.
6. The device according to anyone of the claims 1 to 5,
- 35 wherein the device comprises a plurality of substantially parallel tips (303a, 303b, 303c, 303d).

7. The device according to anyone of the claims 1 to 6, wherein the wavelength of the light beam (206, 306) is adapted to match the size of the tip (203, 303) so that a sufficient amplification of the emitted light beam is achieved.

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8. The device according to anyone of the claims 1 to 7, wherein one or more of the tips (203, 303a, 303b, 303c, 303d) are metalized.

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9. The device according to anyone of the claims 1 to 7, wherein the vapour is a gas out of a group of gases comprising Halides, Hydrides, and Metal Organic Compounds.

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10. The device according to anyone of the claims 1 to 9, wherein the vapour is a gas out of a group of gases comprising AuClPF_3 , $\text{W}(\text{CO})_6$, TiCl_4 , TaCl_5 , WF_6 , SiH_4 , GeH_4 , $\text{AlH}_3(\text{NMe}_3)_2$, NH_3 , AlMe_3 , $\text{Ti}(\text{CH}_2\text{tBu})_4$, $\text{Ti}(\text{OiPr})_4$, $\text{Ti}(\text{NMe}_2)_4$, $\text{Cu}(\text{acac})_2$, and $\text{Ni}(\text{CO})_4$.

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11. A method for patterning structures (207, 307) on a substrate (201, 301) by a device including an imaging device (202, 302) and a light emitting device (204, 304), the method comprising the steps of:

providing the substrate (201, 301) underneath a tip (203, 303) of the imaging device (202, 302);

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providing a vapour of a material, which is suitable for Chemical Vapour Deposition onto the substrate (201, 301) when decomposed, in a space between the tip (203, 303) and the substrate (201, 301); and

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exposing the tip (203, 303) to a light beam (206, 306) emitted by the light emitting device (204, 304), wherein an intensity of the light beam (206, 306) is not enough to decompose the vapour, in such a way that the tip (203, 303) intensifies the electromagnetic near-field to an extent that the vapour is decomposed.